## Newark Shop Notebook, Cat. 1182

This set of forty-eight unbound and numbered pages covers the periods July 1871-January 1872 and August-September 1873. The entries on pages 1-37 are signed by Edison and are in his hand. They deal with the development of automatic printing and chemical telegraphy. Detailed drawings supplement the text. The name of Joseph Murray appears frequently as a witness. The entries on pages 39-48 are in the hand of Charles Batchelor and relate to the electric pen, electromotograph, and battery tests. They are signed by Edison, Batchelor, James Adams, and Edward H. Johnson.

E 1674-2
Cat 1182


Newark N.J. July 26th 1871.

Record of Ideas as they occur day by day applicable for the Dot & Dash system of Fast Telegraphy invented for Geo Harrington & M Craig = All of which are for them & with the exception of one undivided One fourth interest in all patents caveats or ideas I myself applicable to that system and the proceeds from that one fourth interest either directly or indirectly =

I do not record about four previously carried out inventions - but commence at this date to record all my ideas made previously to the opening of this book which I have not put in practical operation at the time of writing; and if possible all future ideas relating to this system while it shall be my interest to do so =

T A. Edison

July 28. 1871.

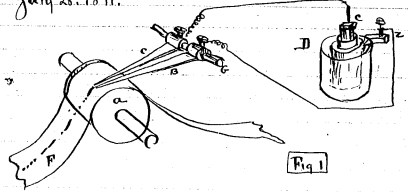



Fig 1

Chemical Telegraph Pen.

In this case I do not pass the current through the paper by using the paper carrying drum a as a conductor in the usual way, but pass the current from one pen to the other (pens c B) across this paper the current from one pen to the other (pens c B) across this paper the pens c B are insulated from each other on the shaft C and one connected with Carbon and the other with Zinc, so if the paper a be chemically prepared and the drum a rotated a the chemicals with which the paper is saturated will be decomposed as long as the current passes from c to B through the paper, but if the current is interrupted the mark will cease. The object of arranging the pen in this manner is to make the paper resistance variable, so that when the paper is too wet or the line is short and there is too much battery on, the pens can be seperated which increases the resistance to the passage of the current. and a lighter mark is made which is too heavy or blurry when the paper is wet or the current too strong. Another advantage which this pen has is that the distance which the current has to travel through the paper can be reduced to the $\frac{1}{500}$ of an inch or even less. consequently reducing the resistance greatly and allowing a number of these receiving apparatus to be worked in one circuit without the electrical contrivances which has been found necessary on account of the tremendous resistance which the current encounters in passing through the paper in some instances, paper properly wet. has a resistance of 200 miles of 13 ohms each. To a current passing through it, But by the use of this pen the pens c B may be adjusted from 3 to 4 times as close as the thickness of the paper thereby reducing the resistance from to 50 or 75 miles



Continued

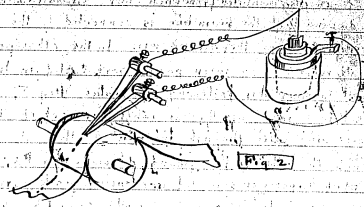



Fig 2

Fig 2

The pens may be arranged in this manner, one before the other, and a very close adjustment obtained – or what might be still better arranged them like that in fig 3. The pen C playing in between two prongs on the pen B the object of which is to get more surface on the non-recording pole or pen so as to reduce resistance.

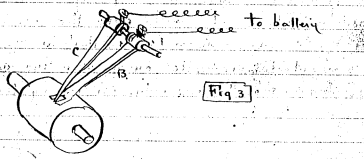



Fig 3

I have shown these pens with flat ends, but they may be provided with little rollers or wheels.

In sending positive & negative currents, for a chemical Telegraph the following idea has struck me –

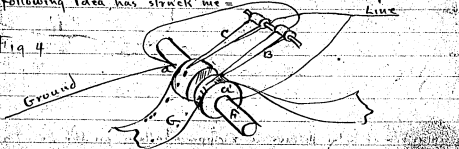
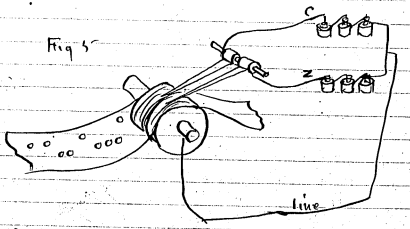



Fig 4

a and a' are paper carrying rollers insulated from each other on the driving shaft F on these two rollers are two

C B also insulated from each other, as will be noticed by referring to the drawing that the main line is connected to the pen and the opposite roller and the ground wire to the other pen and the opposite roller. Now when paper perforated in two lines and sent through this following apparatus Fig 5, a positive Current will pass over the line when one set of holes passes under the pen and pass through the pen C through the paper thence through the roller to the ground decomposing the chemical solution with which the paper is saturated and leaving marks corresponding to the holes in the perforated paper. At the other end of the line, now the same Current will pass through the roller A thence through the pen B and to the ground but in this case the Current passes through the paper in an opposite direction, consequently the marks if any will be underneath the paper and not be noticed while it will leave no mark on top – if now a current of opposite polarity is sent over the wire the reverse action takes place and the pen B records, so that a dot on one line will represent a dot and a dot on the other line will represent a dash. Fig 5 shows the apparatus for sending the double rowed perforated paper –

Fig 5




The upper row of holes throws a Copper battery on the line and the lower holes throw a Zinc battery on the line



Syphon, chemical pen. – or device for recording chemically upon "dry paper"

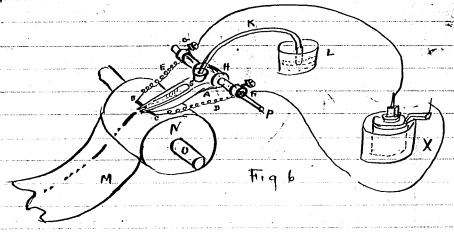


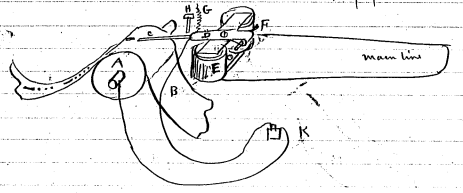

Fig 6

A is a hard rubber or any pen constructed after the manner of a drawing pen. It is secured to the shaft P and moves freely on it, and may be held closely on the paper by a spring. B and C are small platina points passing through each prong of the rubber pen at its extreme end and between which points the solution passes on to the paper E and D are wires connecting these points to the binding screws F and G and thence to the battery X S is a small funnel into which a syphon K leading from the reservoir L passes and keeps the pen supplied with the Chemical solution as fast as it is used Now when the drum N is revolved carrying the recording paper M. The pen gives out a continuous line of the chemical solution which being colorless leaves no mark and is quickly absorbed by the paper. But if the Current is closed for an instant all the solution passing the platina points at that moment will be decomposed and passing on to the paper it will leave a mark. The syphon might be dispensed with and the solution supplied to the pen by dropping it drop by drop (according to the speed of the drum) into the funnel S. One fact I will mention here is that only that portion of the Solution which is directly in contact with the platina points will be decomposed –

All written July 28 1871
Witness for T. Murray T A Edison

Device for receiving by chemical Telegraphs =

Fig 4




In the ordinary way of receiving on chemical paper the pen or stylus C always remains in contact and the circuit of the main line is connected to it (C) the drum A, and the current opened & closed at the distant station leaves dots and dashes formed by action of the main line current upon the paper, But one great drawback to the practicability of receiving in this manner either by the main or local current is that the dots and dash Tail out, (ie) continue to make a mark after the Current has ceased, the reason of this has not yet been explained The above device is to prevent this "Tailing" and is brought about by connecting The Magnet E, pass' in the main Circuit and the stylus C Drum A chemical paper B armature D in a local Circuit within which is the battery K. H is a stop screw for D & G a spring to draw D from the magnet the armature lever & stylus & pen holder A pivoted at P.

When the Circuit on the main Line is closed it operates the Magnet E bring the stylus C down on the paper. & the current of the Battery K decomposes the solution on the paper & leaves a mark as long as the magnet is closed if the Magnet is now opened the stylus C is lifted entirely off the paper by the action of the spring G &c Hereby effectually preventing the tailing of the Characters which is being received which would otherwise be the case if the pen was allowed to stay on the paper and the Current through it



simply broken,

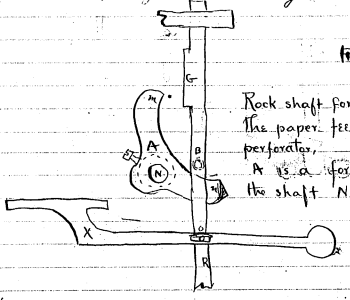
* The chemical paper might be dispensed with entirely and the record made from an inking ribbon. If the stylus C had a point or roller at its extreme End and an inking band passed gradually by clock work between it and the The paper every time the magnet was actuated by the Current the roller would be brought down and pressing the ink band on the paper leaving a mark, Or the Drum A might have an inking band wound around it and the pressure of the roller on the End of the stylus C would be sufficient to impress the ink upon the paper on the underside of the paper Or the drum A might have an inking roller to make a slight line in the middle of its periphery directly under the roller on the stylus C. so that when the roller was brought down the pressure would be sufficient to make the paper take ink as long as the pressure Continued =

August 8th 1871

T A. Edison,

Witness, for T Murray

Fig 8

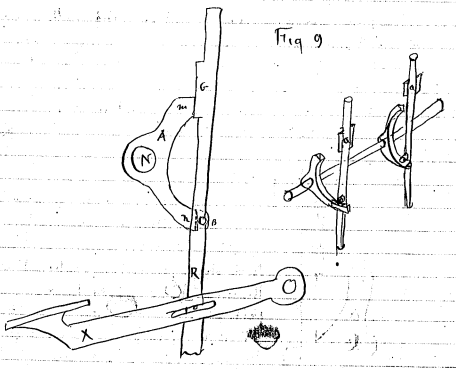



Rock shaft for giving motion to the paper feed in my large perforator,

A is a fork piece secured to the shaft N by a screw or other means B is a pin having a roller on it G is a square piece

upon the upright R. When the key X is depressed the upright R is carried with it and the roller B coming in contact with the fork pieces A at n. thus rotates the shaft N, and at the same time the m end of the fork A comes in contact with the square G and the n end being down so far below the center that it ceases to act as a lever or means of rotating the shaft and the wheel or roller B slides down the straight part at N. It is obvious that by the two prongs being long and being arrested at two different points makes a perfect "lock" of the rock shaft N and prevents any momentum, of that shaft from taking up the dead motion, occasioned by imperfect mechanism there being a dead lock in this case and no loss motion to take up. Fig 9 will show the position of the fork and key when it is depressed to its full stroke and a dead lock takes place of the Rock shaft

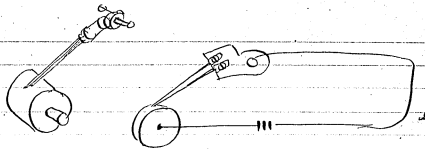
Fig 9






Aug 8 1871.



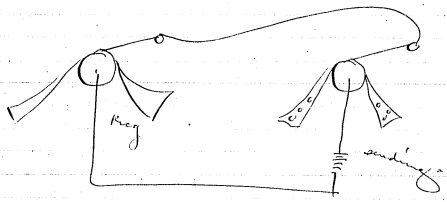


I claim two pens for recording chemically which shall be connected together electrically, one pen I put about the one hundredth of an inch ahead of the other in the same line, The object of this is to reduce the resistence of the paper. and make a double decomposition; as the resistence of the paper is reduced one half by having two points it follows that very near as much current will pass through each of the two points as one as twice as much current will be taken from the battery, now one pen passing over the paper will leave a mark of a certain intensity and another pen passing over the same mark will increase its intensity,

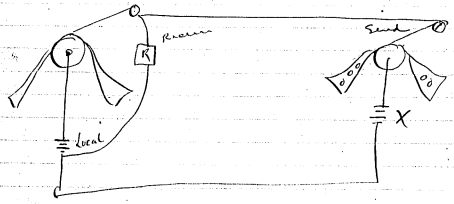
It is not necessary to have them one before the other for they may be placed side by side very close so that one pen shall make a very fine mark and the other will double its size so as to make it legible,

Another Idea, In a iron solution (10) prussiate of potash or other solution with which an iron pen is used to decompose and in which there is considerable acid, an excess of acid may be used so that when no current is passing the acid will attack the pen and produce a mark but when the current is passed through the pen & paper it will prevent the acid from attacking it or prevent the mark whatever it may be caused by, by this means the resistance of the paper may be materially reduced on account of the possibility of using an excess of acid

To produce this effect it would be necessary to arrange the Transmitting & Receiving Machines in this Manner

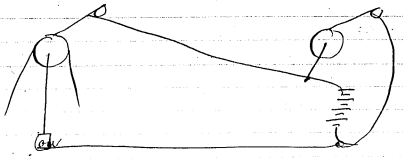



I will now illustrate & describe several methods of arranging the electrical Connections & battery for sending & Receiving =

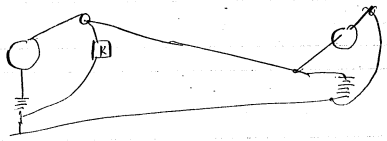



In this Case the Local is used to decompose the Chemical paper & the Main battery X to restore the effect by means of the perforated paper K & the resistance Coil for adjusting the Local so that the battery X will exactly neutralize it

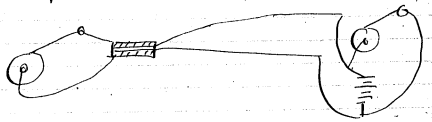




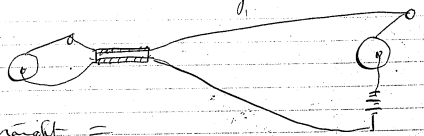

In this Case the Current or rather current is not broken but the battery is cut in & out by the perforated paper & pen
This Can be used with a local



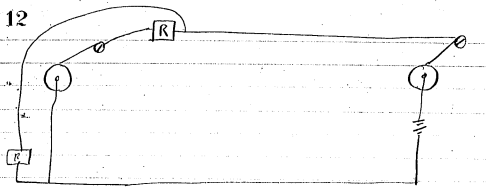

or with an induction coil the current not decomposing direct but acting in the primary coil induces sufficient Current in the Secondary to decompose



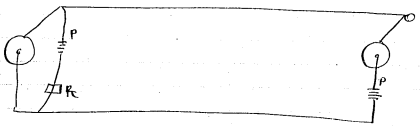
or the induction coil may be used thus



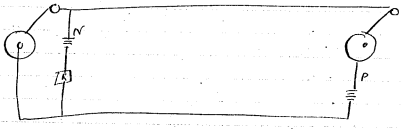
straight =




2 Resistence boxes adjusted so as to split the Current

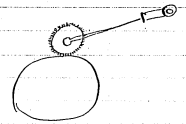



Local which decomposes and main line battery which also decomposed R coil in Local circuit to prevent the Local from making too plain a mark The use of this Local is to electrolize the atoms of Chemical Solution to a point where a slight increase would decompose it which is done by the main

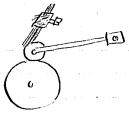



Poles opposite, Main Line decomposing Local neutralizing, Excess of main over Local produces mark when it crosses Local Ends the mark short





fine wheel teeth wheel pen for recording on chemical paper,

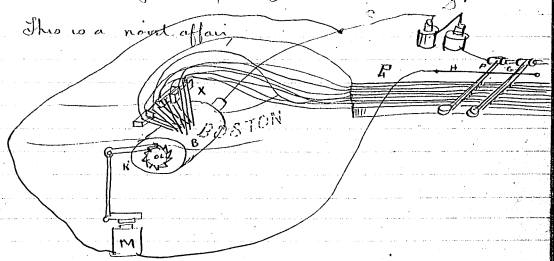


Wheel recording device on chemical paper, with a brush to keep it clean.

Jany 16 1872. J.A. Adam Smith
Witness Jos F. Murray

A chemical printing Telegraph.

This is a novel affair




X is a bunch of flat platina wires secured to insulating substance (a) Each wire insulated from its neighbor (b) the Ends brought down on the platina faced drum B very close so close that but a thickness of a piece of

tissue paper seperates any of them they make a Solid Mass about ½ of an inch Square =
The chemically prepared paper passes between the brass squares X and the drum B, The drum is fed ahead after every letter is made by the Keys Coming in Connection with the rod H
Thus throwing the Battery S through the magnet M as will be seen by the wires.

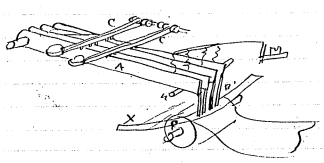
Now Beneath the bank of keys are Exactly five rods or as many rods as there are platina points in the pen square X. Each one of these brass Cranks Connected to a platina pen forming the brush The bottom part of the Lever or Keys having its teeth on and these teeth are so arranged that they will connect the Battery S through a given number of rods necessary to form a letter To the points on X and the Current will pass down these selected points Through the Chemically prepared paper to the Drum thence to the battery S Leaving a blue or other colored mark at Each Point For instance the Letter H would be thus.

The first row of points would all mark a Leaver (a) The second one dot of c the 3rd another dot of c the 4th another do & the fifth row all the marks The End view of the square is thus.

In practice it is possible to place them much closer than this it will be easily seen that certain points Can be selected to given any Letter figure & Sign in any Language Now by raising the Key the Battery is thrown off of the deenergizing points and through thrown through the Magnet M which advances the Drum B ahead ready for



the next letter,
I do not wish to confine myself to printing on a Strip of paper; as the Brush X might be made to travel over a Wide strip of paper side ways & then back and at every step decompass a Dial or 40 more or less brushes might be used and a Commutator made to throw the Electrical Connection from one brush to another clear across the paper and after a line had been printed the paper Could be advanced and the Commutator made to throw the Current back to the first brush & then one step by step to each brush until another line had been printed I could dispense with the magnet to draw the paper and substitute any power manipulated with suitable mechanism and controlled by the Key or Keys, The bars might be dispensed with and wires substituted or any arrangement by which any given Key could select the required number of recording points to make a letter
I could dispense with the Chemicals and record with ink in this way




A are the rods 25 more or less in number arranged Like Levers underneath the Keys these Levers have on their End the connecting wires are arranged together in a bunch making a almost solid square each fine wire being connected to a lever and working seperately from all the rest The End of all the wires attached

to the levers would appear this way &

The word ship being printed thus,

SHIP

But somewhat clearer and legiable, the keys over these levers Could have teeth arranged to actuate the levers or the levers could be provided with teeth which I think the most Convenient,

The paper would be fed by a movement derived from the Movement of the Key or Controlled by such movement the way I use the Embosser in this Machine I used an Ink band passing between the making points and the drum or Printing paper which passes over the drum This Ink band is fed along by a movement derived from the Key or may be driven by Magnetism Etc,

The principle of forming Letters and printing them on strips of paper or other substances by the depression of Keys I Claime to be original with myself

I have shown the principal features but the small devices are of no Consequence Being but ordinary movements well understood and Easily Combined,

The Ordinary perforating Machine of my invention now in use Could be provided with 25 Bars somewhat to what is called Gunnels 6 on But much thinner (a) the Cranks in placed of the Gunnels are used (and) the Ends of these Levers being provided with the printing points Closely gathered (2) this put over the Bars so that the depression of the key wanted Carry forward the required number of bars to form that Letter Etc corresponding to the key

Jany 18 1872

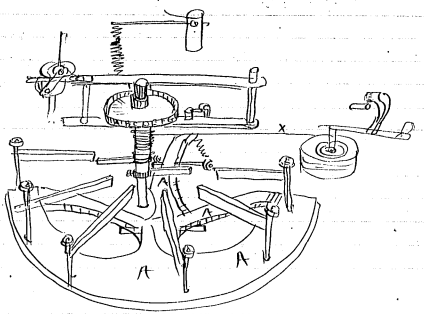
T A Edison

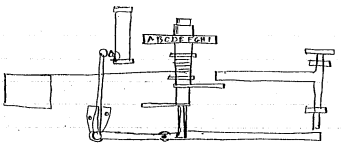
Inventor

Jos T Murphy Edison

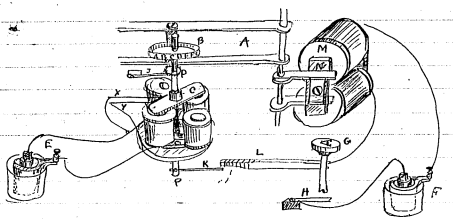


Printing Machine, Type writer for Cash



Printing Machine.




The object of this invention is to print rapidly on roman letters upon a a continuous strip of paper,

B is the type wheel P is the shaft running between centers, & through the bed of the Engine, C is a the Engine revolving Armature x y the Engine break Spgs. E the battery this armature C. revolves with tremendous rapidity Carries the Shaft P and type Wheel B with it by friction, and when the shaft is arrested by the depression of the Key A arm L and the pin K the armature Keeps right on revolving, and when the key A is raised the Shaft is free and the friction of C. grabs the Shaft P & Carries it forward

A represents the key of which there are 30 More or less, These Keys are arranged around in a Circle and have a Connection ring of which H, is a part and shows the operation This ring is Connected with one End of the battery & the printing Magnet M & there to Keys So that when any Key is depressed the



bottom comes in Contact with the ring represented by H and the printing Magnet and the Printing is effected, Owing to the Immense rapidity of the revolution of the type wheel it is sure to be arrested before the Key closes on the ring and the Magnet changes,

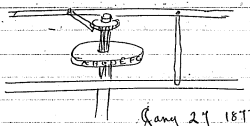
I do not wish to confine myself to this particular form as it may be necessary to adopt some devices to Ensure the arrest of the type wheel before the printing magnet is closed this may be done by putting on a brick wheel on the type wheel shaft and arresting it on a closed circuit, or the Circuit may be closed on the Key A at L and the pin K.

What I claim is rotating a type wheel and Shaft by Magnetism, and Catching it by the Keys & Printing by Magnetism or by any other forces; and allowing the Engine to go on after the types wheel has been arrested,

I is a ratchet wheel pawl which works in a ratchet wheel secured to the shaft P. The use of which is to prevent a rebound when the pin K is arrested by the Key arm L of the Key, the ratchet pawl after the pin strikes L falls in a tooth and holds it there while the Letter is being printed,

I do not wish to confine myself to this mode of stopping the rebound, as the rebound may be taken up by a roughened wheel in place of the ratchet wheel on shaft P. & a pawl with a roughened surface Connected to the printing lever which when the lever Comes forward to print the pawl would give a forward motion to the type wheel shaft P and bring it to the stop I

and take up the rebound thus



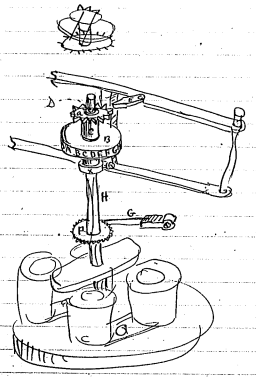
T A Edison

Jany 29 1872

Jos. F. Mowrey

I do not wish to confine myself to Magnetism for driving the type wheel shaft as a train of Gearing actuated by a Spring Weight or any other force Could be made to rotate the Shaft, the printing Could be effected by throwing an arm out from the printing Lever into the path of pegs on one of the gear wheels or the motion to print could be derived from the downward motion of the Keys =

I have this Printer arranged in this form now





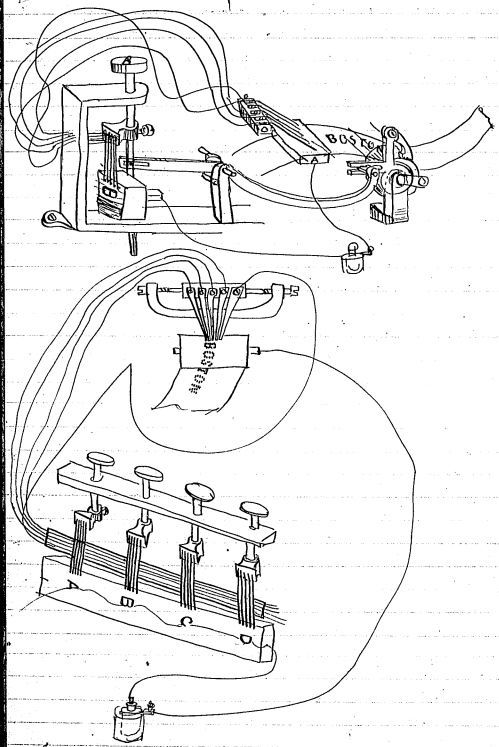
H the shaft P & G the device previously described to prevent the rebound C a sleeve on which is secured the type wheel B, stay Connecting Wheel a held up by the Collar X E a detent for Connecting position of type Wheel, The sleeve C & devices is connected & Carried around by the shaft H by a slot in the sleeve & a pin in the shaft shown at S. this slot is larger than the pin and allows some deadmotion so that when the shaft is suddenly arrested by a key and it should rebound so that the paul G did not happen to fall in the right to catch the type Wheel being a little Loose the detent F would bring it right when the printing Lever Came forward

The speed of this printer might be increased by Cutting a double Alphabet on this wheel without increasing its size and double the speed Could be obtained in printing without increasing the speed of the rotation of the shaft H But the Letters would have to be a little smaller,

I may find it necessary to attach the interrupting break wheel to the main shaft to interrupt the printing Lever Current so that it Cannot Come forward until the type Wheel has stopped, I used this on my Printing Machine the patent of which has already been applied for =

Jany 29 1872 T A Edison

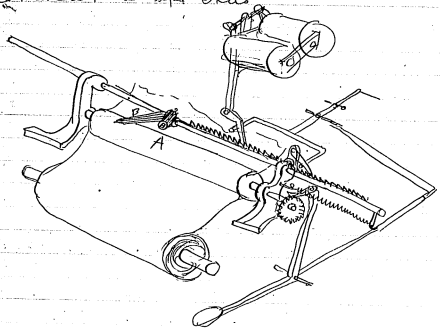
I will now describe another printer Worked Chemically





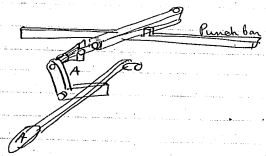

A discription of this apparatus is not very necessary there are 30 Keys. Each Key is provided with a Comb and of fine Contact points underneath the Keys is a long perce of hard rubber and metal letters of the alphabet sunk in & flush with the top, Each there is a recording combs also of five wires rests on chemically prepared paper rotated by a drum which is drawn forward by the depression of the Key Now the first wire in Every Key Comb are all connected together the second wire of Every Comb is also Connected so on now the first wires of all the Combs being Connected together they are then Connected to the first wire of the recording Comb the second to the second Now all the metal letters are Connected together and attached to a battery and the drum is attached to the other End So that by depressing a Key its Comb passes over the metal Letter and adware makes Contact sending regular pulsations to the recording Comb to produce that particular letter after the manner of the Bonnelli Type Chemical Telegraph. While the letter is being made the paper advances by the action of the Key The letters might be placed on the Key and the Comb remade stationary.

The recording pen might be made to travel
(1) back (2) forward over a sheet of Manuscript paper
(3) Make a Midi Tape Thus




A is the main roll B Travelling pen the rest is easily understood - The Usual devices Can be used Similar to that used on my Mechanical Jointing Machine.

This is a new movement on my perforator for throwing the punch bars forward

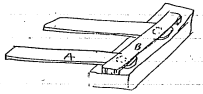



A goes forward by depressing the key



until the round End of the Cross bar goes over the Top then the punch bar is thrown back by the action of its spring Carrying the Cross bar with it Now when the Elbow A Comes back it throws the Cross bar upward by reason of the incline on the Elbow & passes under it Thus being enough deadmotion in the Cross bar to allow of this

The Cross bars have heretofore been pivoted or had their fulcrum of a Thumbscrew The Thumb being screwed on one long bar Now I propose to dispense with drilling & tapping 30 holes (2nd) using thumb screws by Casting slight tits or bosses on the bar & milling them up and putting the Cross bars on them & preventing them from Coming off by fastening a plate over the whole of them Thus

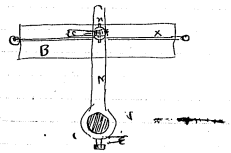



A the brass piece of the bars and tit C the long bar the tit & the thumb Cast in one piece
B is the plate which prevents those Cross pieces from slipping off the bosses

I propose to try the experiment of dispensing with a spring to each key in my perforator of which there are Thirty - by using a friction plate and some small pins in the keys and when the key rises suddenly it comes up sideways against this plate and puts a slight friction on it sufficient to hold it there until again depressed.

Now all the keys being held up this way I put a rod sliding underneath the whole of these keys and connect a couple of springs to it when a key is depressed it carries this bar with it when but not till the spring on the bar throws it up & the key with it.

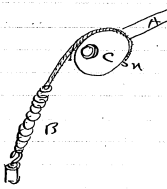
On paper feed for the perforating Machine I propose to alter it by putting in a swivel on the paper feed bar, thus




B the plate N the swing lever connected to the rock shaft this lever performs an arc of a circle X is a guide pin to keep the click straight



Device to get a constant spring motion of the rock shaft of my perforator, thus




A is the rock shaft B a spring C a cam or eccentric shaped wheel. n is a pin to which is secured the cord connected to the spring B,

Now when the shaft is rocked the spring gets Cot closer to the fulcrum by reason of the eccentric wheel

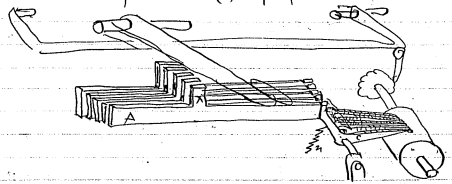
I go to bed

Jan 30. 1892.

T. A. Edison

Geo F. Morrison

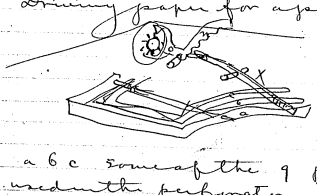
New Idea for Printing ~~Telegraph~~ Machine




A are 7 bars ~~are~~ moving 7 bars e up and down aff of the recording drum

These seven Levers are thrown down upon the drum by the forward movement of the Bars A This drum Carries the paper between the paper and the C bars and an ink band The A Bars are grounded with 30 rows of bits down the side of which pass the side of 30 Key. Now on the ends of these bits are the Letters of the Alphabet in relief The Key in passing down throws forward the Bars exerting to these Relief parts of the Letters on the bits at the same time. the paper drum is being moved forward by the downward motion of the key It will be seen that this is but a mechanical way of producing the result Chemically as shown on page 22 & 23 this Book Communicated by hand with the recording pens Mechanically instead of Electrically further discription unnecessary

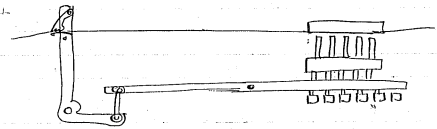
Drawing paper for a gentleman



a b c some of the 9 pound Levers used in the perforator X is a Lever which has a rock click on the End Loose going up down rigid going up

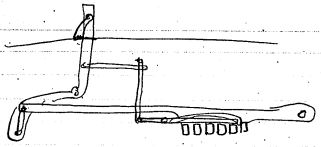


on a rack connected to a release Escapment Lever which releases the paper drum driven by weight, step by step The last key on the punch Levers being Nearer the fulcrum of X than the first will shave X further Now X is going down having a loose click does not Vibrate rack n but in going up Vibrates it releasing paper drum a notch Every Vibration The number of vibrations being governed by the length which X has gone down which is governed by the punch used which is nearest to fulcrum it may be used this

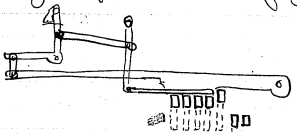


Description unnecessary

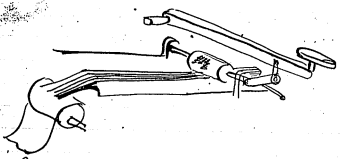
The printing device described on page 27. who seven recording Levers Might be Cutting punches and cut the Letters out instead of recording them then this prepared Story Called be used for transmitting in a Machine already described by me another book where is Letter Endless paper



Perforating Japan field measurement for perforator

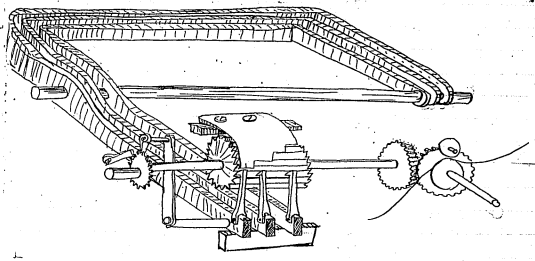


different

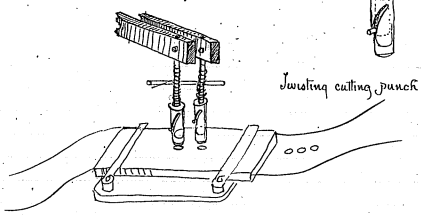


Printing Machine different shape from that described on page 27.

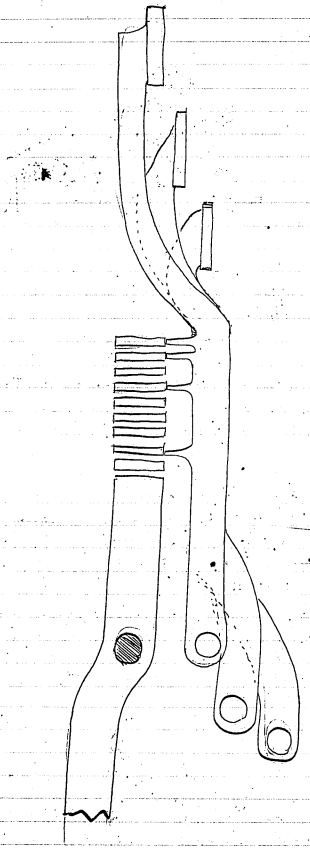




paper feed, the punch bars determining the distance

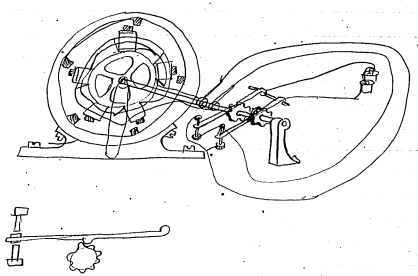


Twisting cutting punch





Electric Engine.

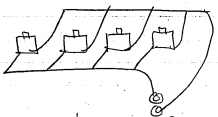


This Engine is somewhat dissimilar to that of any other heretofore made although resembling greatly in appearance other,

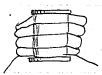
The outside ring is stationary & is provided with armatures, arranged in relation to the Magnets that when all the magnets are Charged, every magnet will draw itself up to the armature, the drum Carrying the Magnets will then revolve the distance between One of the armatures be changed and draw themselves up again

The break consists of two toothed wheels Insulated from the shaft & each other and upon which rest two springs, also insulated from Each other these springs are from platina points two above & two below so that when the teeth on the wheels raise both Levers up they will Come in Contact with both

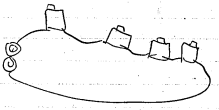
platina points and these platina points being Connected to the Magnets: and the top of Spring being Connected to the Battery. The Circuit is thrown through all the magnets Not as it is usually done but [redacted] way



These magnets and bars in Constitutes my improvement Consists of very fine wire Say from No 20 to 36 or even finer Whole battery are of one wire Each magnet is made thus



five or six Sections and Each Connection or section So Connected [redacted] The Current splits and divides passing through all one wire Through these circuits provided for it + Emerging to one wire again, these magnets Made Latter manner are Connected as shown in the top sketch or may be them

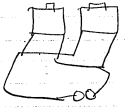


It is a law of magnetism that the greater number of Convolutions of wire around



the Core the greater would be the effect, Taking Care about the resistance, I would for parties experimenting with Electric Engines use very large wire and thus obtain a very low resistance, but have but few Convolutions. I also obtain an extraordinary low resistance by surrounding a number of rooms Each having a large No of Convolutions and aggregately an enormous number, but they were Connected that among to the no of rooms, Combined the resistance is reduced from say 300 Ohms (if the wire is Connected as is ordinarily done) down to 2 ohms, for Each magnet and by Combining the magnets after this plan I reduce the total Resistance of the Several Magnets to 1 ohm for the whole and at the same time have an enormous number of Convolutions of wire, I have discovered that if 100 feet of Copper wire of 1/2 spools having [redacted] or one magnet has 6 [redacted] Resistance

and the Current is passed through it it will lift say 2 lbs, if now we take a magnet with 24 ohms resistance Each spool having 12 ohms + Connect them thus



or thus

We reduce the resistance to 6 ohms But obtain times the force or 4 lbs: without any more Consumption of material in the battery -

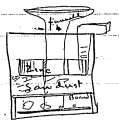
Another thing I take advantage of in the Construction of my Engine which is that in all Electric Engines now in use the Current Through the magnet must be broken before the Magnet approaches the point where the most work is done for if this was not done the armature passing over would be retarded owing to the Slugishness which the Current or magnet discharges. I get around this by keeping my Current on until up to Twenty Centr (20) the armature is opposite the Pole of the magnet then it will be absorbed by referring to the break with its upper & lower stops that the Current is reversed for an instant through these Magnets & thus instantly discharge the Current is not kept in long enough to effect a discharge of the opposite polarity

Another advantage I claim is having all the magnets pulling at one time and a large momentum or fly wheel to Carry it over the spaces between where the [illegible] pull

The Spelling of the magnets as described I claim to be applied to other purposes.

I propose to apply it to printing Telegraph Winding an ordinary Stock Bunter 6 ohm 24 wire with No 30 wire 24 ohm and by Connecting as hereinfore shown reduce it to 6 ohm



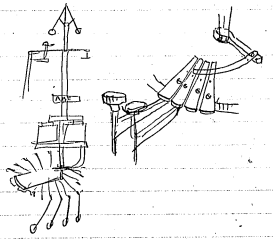



B. V. Ibid
Rattler

I claim a board perforated with holes and Setting on legs or such or so from bottom Underneath which a Copper sheet,

I claim the Saw dust on the perforated board or material of any kind perforated and A funnel for feeding the underneath the perforated disk with Sulphate Copper

I claim running two [illegible] wheels by two Electro motors, and keeping them in unison by a governor on Each Engine, and operating by a Single lever



X-E-1674 (-3)

Painter = Typewriter?
Ruffi Shades & Gaskets
Electric Pen
Copying Rollers
Electromotograph.
Inks
Batteries, Primary

XE1674

Aug 27th 1878

Had Wenzi alter 4 letters out of Mr Reiff's Stols & Gladden printers by taking out the letters & pushing in spikes

Chas Batchelor.

Sep 2 1878 Reduplications of Copies

Made new roller for press of washers of cloth punched out like Fig 1 & put on an arbor in this manner Fig 2. The collars were made of cast iron & pressed on the iron core left rough in middle & turned down in screw mach at each end the handle was bent like Fig 3 & the handle made like Fig 4 & rivetted into the frame & the handle were made in screw machine like 5

Fig 1

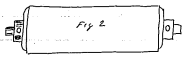
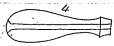
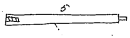


Fig 2

Fig 3



4



5

This was adopted as a model & work from. After all the cloth is on it must be shaved level.

Made new engine with No 22 wire spools & it works or one cop but we shall have two for an excess

Our new vibrator pen made by Gilliland is very good but it has kinks which deter it from going out to any body but a man that understands about electricity You could write much faster with it & it make better copy but sometimes it will run for hours & then stop, as soon however you touch it or perhaps shake it runs off again

Ales improved the mfr by adding rod sleeves.

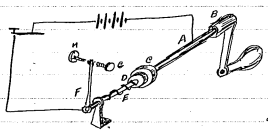
Chas Batchelor Jas Adams

T A Edison



Electromotograph. Sep 2nd 1878

Made a new style of Engr. We found that Acetate of Mercury & Caustic A were best for Engr. & Tue had an idea that if we could cover the drum with leather & keep it moist it would work just as well So we designed a machine like sample Fig 1




A is a spindle carried by handle B, on the end of which is a hard leather faced disk C, against which the plate D of Platina rubs. The handle being kept turned by friction of plate C against D keeps the point F against side of the screws. but when the current is put through & the friction discs kept moist with Acetate of Mercury & Caustic A the lever will respond to every stroke of the Key. This worked very well the first time for a wonder.

When freshly wet the mercury solutions work well on Engr repeating it as good as it comes but after laying by a while we find they do not work satisfactory

A small amount of either Acetate of Mercury or of Caustic Potash does not work well

Thos A. Edison

Chas Batchelor
James Adams

Sep 3 1875

Inks.

Indego Sulphate + Glycerine no good, insoluble
Printing ink + " no good
Common Printers ink alone very fair could do nice work with it but not near so well as with the Anilines.
Whale Oil + Union Blue no good
Printing Ink + Bears grease mixed no Good Blot + run.
Aniline Black + Glycerine no good not soluble.
Glycerine + Union Blue no good

Thos. A. Edison
Chas. Batchelor
James Adams

Sep. 4th 1875

Found a new platina Solution
Sulphate of Aniline & Protochloride of Iron
+ . . . . .
This is a specimen

Thos A Edison
Chas Batchelor
Jas Adams

X-E-1674 .3



September 10th 1875

Tests of Grenet Batteries for Polarization

1. 1 tablespoonful Bichromate K. dry.
3 " $SO_3$

Bradley Galvanometer Ds 4 coil 65½ degrees
40 seconds 61½
60 " 60
75 " 58½
120 " 57

By shaking constantly it stands at 90°

2 By putting in 6 or 8 tablespoonfuls of $SO_3$ it stood at 78
10 secs. 68
20 " 65
90 " 57

By shaking it stands at 90 all the time

3 Powdered Bichromate K, put in bottle + a little more $H_2O$ than was necessary + used it then 4 tablespoonfuls $SO_3$ poured in shaken ½ min then filled with $H_2O$.
95
5 seconds 60
40 sec 56
Shaken stands 68
Shaken with another zinc 65
10 min 58

3 Regular Electropoion Shaken 68
10 secs 62 runs down
15 secs 60
20 secs 59

We have found Galv. wrong.

4 Zinc & Single bindpost of Galv.
Regular Elect. 65
1 min 60
2 min 59½
Stench 6f when shaken constantly
In 1 minute runs to 60 stops 5 minutes at 59½ perhaps it will stop there. We now put up an Elect battery at 3 AM Sept 16. at 59½ deg. works engine powerfully & satisfactorily am keeping engine running constantly on it 3½ a m no slack yet. 335 OK undiminished 345 ditto
4 AM Engine running with undiminished power
4·35 " " " "
5 AM " " " "
5·35 " " slightly diminished
6·10 " " Zinc considerably reduced
10·00 AM " " will still work but slow
11 · AM " stopped.

5 Regular Bichromate K +
Acetate of Mercury 68
30 secs 61
60 secs 60½
90 secs 60½
2 mins 60½

6 Half regular Bichromate + Half water +
Ferrocyanide Copper 64
15 secs 58
30 " 57½
1 min 56
1·15 56
1·30 55

Phenomenon!!! Regular Elect, + Acetate Mercury Glycerine added after 10 or 20 seconds immense effervescence some powerful action in Glycerine



gives deflection of only 20.

7 Ferrocyanide K + Com Electrop. 53
10 secs 47
20 46½

8 Sal Ammoniac + Com. Elect. 68
10 seconds 61
15 " 60
30 " 55
needle keeps moving sensitive & jars jarring depolarizes
60 seconds 56
probably stays at 56

9
Small jar Carbon + Copper
Com Electrop. 16 runs up to 20
add NO3 goes down.

10 Hydrochloric 4 drops only, hadnt enuf. try it 70
15 secs 62
30 secs 60
1 min 59½
stops there
HCl too small

11 Small cell Acetic Acid + $H_2O$ + ½ Carb of Lead tea-spoonful NO3 2 deg Rheogon

12 Salt petre + Com Electrop. 69
10 secs 59
30 secs 56
1 min 56
it will probably stay there.

13 Strong sol. Nitrate K. 15'
added 20 drops Nit. A. no better
$SO_3$ added " 17 min

14 Tablespoonful Chromic Acid + $H_2O$
30 rapidly polarizes
$SO_3$ added tablespoonful 55 rapidly
retreats + 50 45 40 35 30 28
probably stand there added Sulph Potash
40 35 20 min =

15 Regular Black + Nitric acid
69
10 secs 62
20 secs 60
1 min 58
Goes gradually down
1 min 20 sec 56½

16 Sat Sol Bichrom K.
Tablespoonful $SO_3$ 68 rapidly goes + 55
3 more teaspoonfuls $SO_3$ 70
1 min 69½
2 min 69-½
3 min 69
stands at this again 70
1⅛ min 68½
2 " 68.

17 2 Grenet Battery one size No 1
holds 6 fluid oz $H_2O$.



18 ½ oz powdered Bichrom K
½ fluid oz $SO_3$ — $H_2O$
5 sec 57
20 42
when shaken stands 60 after shaking
goes + 50 in 1 min stops there
another shake stood 62 goes + 55 in
5 seconds, 1 min 50½ added 1 fluid dram
more $SO_3$ — 60
10 sec 55
30 52
put ½ oz more Bichrom K
67
5 sec 65
10 64
30 63
60 62 stands there

19 1 oz Bichromate K
2 fluid drachms $SO_3$
68
10 sec 66
30 sec 63
1 min 61½
2 " 61
This is better than that on engine
shaken stands at 68
goes + 62 in 1 minute
8 minutes 58
10 " 57½
shaken again + goes + 57 in 1 min.

48

20 Regular Buchsow + H2O 1/2 + 1/2

| | |
|---|---|
| | 68 |
| 10 secs | 60 |
| 20 " | 59½ |
| 1 min wet | 60 |
| 2 " " | 62 |
| 2½ " " | 63 Line eats badly |

Hough boils

Thos A Edison
Chas Batchelor
Ed Johnson
James Adams